

研究报告

牛黑素皮质素受体1 (MC1R) 基因与毛色表形的研究

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摘要

牛MC1R基因不仅与毛色有关, 而且与牛乳中乳蛋白的含量有关。利用PCR-RFLP和DNA测序技术分析了我国荷斯坦黑白花牛, 中国荷斯坦红白花牛, 鲁西黄牛和渤海黑牛共4个品种的MC1R基因。共检测出3种等位基因(E^D , E^+ , e)。中国荷斯坦黑白花牛主要是 E^D 和 E^+ 等位基因($E^D=0.12$ 、 $E^+=0.80$); 渤海黑牛也主要是 E^D 和 E^+ 等位基因($E^D=0.52$ 、 $E^+=0.47$); 中国荷斯坦红白花牛和鲁西黄牛大多为 e 等位基因($e=0.95$)。中国荷斯坦红白花牛和鲁西黄牛还存在 E^+/e 基因型。由此推测 E^D 和 E^+ 等位基因导致黑色素合成。另外发现牛MC1R基因编码区725处存在一重要的SNP(单核苷酸多态性)。

关键词 [牛毛色](#) [MC1R基因](#) [PCR-RFLP](#)

分类号

Relationship between the melanocortin receptor 1 (MC1R) gene and the coat color phenotype in cattle

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Abstract

The MC1R gene is related to coat color in cattle and to lactoprotein content in milk. Polymerase chain reaction-restriction fragment length polymorphism and DNA sequencing were used to analyze the MC1R of China Holstein Black-white Cattle, China Holstein Red-white Cattle, Luxi Yellow Cattle and Bohai Black Cattle. Three alleles (E^D , E^+ , e) were identified. Most China Holstein Black-white Cattle had E^D and E^+ alleles ($E^D=0.12$, $E^+=0.80$). The same was true for Bohai Black Cattle ($E^D=0.52$, $E^+=0.47$). On the other hand, most China Holstein Red-white Cattle and Luxi Yellow Cattle had the e allele ($e=0.95$). E^+/e genotype was present in China Holstein Red-white Cattle and Luxi Yellow Cattle. We reasoned that E^D and E^+ led to the synthesis of the black pigment. Furthermore, we found an important SNP (Single Nucleotide Polymorphism) at 725 position of the MC1R coding region.

Key words [cattle coat color](#) [MC1R gene](#) [PCR-RFLP](#)

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